



IDEM's Surface Water Quality Assessment Program

Macroinvertebrate Community Assessment Program

Program Objective

The Biological Studies Section (BSS) conducts biological community assessments of Indiana rivers and streams through the collection, study and assessment of Macroinvertebrate communities (animals without a backbone that can be seen with the naked eye, such as aquatic insects, snails, crayfish, mussels, etc.). Any biological community assessment is a measurement of a collective ecosystem level response to environmental stress and gives an annual picture of the worst conditions which have been imposed on the ecosystem at the point being assessed. When conducted in conjunction with chemical analysis of specific water quality parameters and aquatic habitat quality, they provide a more complete and comprehensive picture of ecological quality of the watershed.

The Biological Studies Section uses these Macroinvertebrate and habitat studies to establish biological standards to which all 35,673 miles of Indiana streams may be compared in order to identify impaired streams or watersheds. These data are used to determine compliance with the existing narrative biological criteria in the Indiana water quality standards, determine the extent of ecological harm, and make correlations to physical and/or chemical impairments which may occur. These data provide the information needed to develop models to assess changes in Indiana ecosystems that affect aquatic life and human health.

In the course of its various monitoring and assessment field activities the staff finds obvious biological impairment due to point and non-point source related problems which are immediately referred to the appropriate IDEM programs. The Biological Studies Section also participates in evaluating Macroinvertebrate monitoring and assessment programs on the Ohio River with the Ohio River Valley Water Sanitation Commission (ORSANCO).

Program Participants

This particular monitoring program is conducted by the staff of the Biological Studies Section of the Assessment Branch. No contractual laboratory services are needed as field samples collected in the field are returned to the BSS Laboratory for enumeration and identification. Data reduction is conducted during the winter months by the section's staff and data are maintained in a sample tracking and relational database format.

Program Description

Media:	Surface water; rivers, streams and lakes
Study Area:	Statewide
Site Selection Type:	Presently 704 different sites on 465 different rivers and streams in Indiana have been sampled. These sites include sites sampled in 84 of the states 92 counties (over 91% of the state). These data represent riffle communities at wadeable stream and river sites and were derived from a study to establish reference conditions.
Sampling Frequency:	Sampling is limited to July-October each year. The fixed station CORE sites are sampled on a rotational basis as part of the OWM Surface Water Monitoring Strategy.
Data Collected:	Benthic Macroinvertebrate community assessment samples are collected by several methods from Indiana rivers and streams. Biological samples are museum curated and maintained for the state. Macroinvertebrate community assessment data evaluating the compositional, structural and functional integrity of the biological community is being established. Concurrent aquatic habitat assessments are conducted to determine if either site specific habitat degradation or water quality causes can be determined. These data are used in determining the baseline reference condition for the calibration of a state wide Macroinvertebrate index of biotic integrity (mIBI) and this is in turn being used in the surface water monitoring strategy of the Office of Water Management.

As a member of the ORSANCO, Indiana contributes in giving ORSANCO the responsibility of monitoring the Macroinvertebrate communities of the Ohio River and the lower reaches of its major tributaries (including the Wabash River). ORSANCO has subcontracted some of these studies to the Ohio Biological Survey and to Universities.

Universities and consulting companies employed by dischargers periodically conduct site or watershed specific Macroinvertebrate community assessments within Indiana lakes rivers and streams.

Program Products

- ▶ Contribution to Indiana's biennial 305b Report
- ▶ Support for 303(d) List of impaired waters in Indiana.
- ▶ Biological Impairment Reports to Inspectors
- ▶ Periodic technical reports on biological watershed assessments and trends
- ▶ Environmental Indicators development to measure success of environmental objectives in support of the Environmental Performance Partnership Agreement (EnPPA) between Indiana and U.S. EPA.
- ▶ Support of Indiana's Remedial Action Plan for the Northwest Indiana Area of Concern.
- ▶ Support the Triennial Review of Indiana Water Quality Standards

Technical Notes

A rapid bioassessment collection is reduced, using a 100 organism sub-sampling method. The sample is then enumerated and identifications of the organisms found within the sample are reduced to ten family level metrics, evaluating the condition of the biological community. These data are in turn reduced to an average multi-metric score for the site and compared to a reference condition.

Contact Information

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